Chapter Six
SUMMARY

The A_O of a system is the probability that the system is capable of performing its specified function when called for at a random point in time. It is Navy policy that A_O is the primary measure of material readiness for weapon systems and equipment. The truest measure of A_O is expressed in the formula:

$$A_O = \frac{Uptime}{Total\ Time} \quad or \quad \frac{Uptime}{Uptime + Downtime}$$

This expression of A_O has two deficiencies:

- Uptime and downtime can only be measured for an operational weapon system or equipment but are not measurable for a system in development.

- This equation does not assist the analyst in determining what to do to improve A_O.

These deficiencies are overcome when uptime is expressed in terms of reliability (MTBF), and downtime is expressed in terms of maintainability (MTTR) and supportability (MLDT). Substitution of these discrete, independent and quantifiable variables for uptime and downtime provides the more useful expression:

$$A_O = \frac{MTBF}{MTBF + MTTR + MLDT}$$

This expression of A_O is useful throughout the life cycle of the system from concept development through disposal. In this process, the factors affecting each variable are categorized and quantified. The analyst has established a mathematical relationship where A_O is dependent upon MTBF, MTTR and MLDT, and also a process for evaluating the effects of changes to a specific variable upon the others and upon A_O.

The utility of this equation and the process requires that the Program Manager:

- determine whether a variable affects reliability, maintainability or supportability

- if possible, quantify that variable

- consistently measure performance against the baseline

- identify those factors that affect A_O whenever a significant change to reliability, maintainability or supportability occurs.

There is no "cookbook" approach to satisfying all requirements that achieve the A_O threshold. Each acquisition program is unique. A Program Manager develops his/her own management matrix, risk assessment process and milestones that are specifically tailored to the requirements of his/her program. This handbook has provided techniques and considerations applicable to the specific requirements of a program in the various phases of the acquisition cycle.

Figure 6-1 is a summary of what has been covered in this handbook. The major components of A_O and the significant factors affecting each are displayed in a matrix format over the phases of the acquisition. This chart is applicable to both the whole system and each subsystem/equipment comprising the system. The Program Manager and the Resource Sponsor both know where they are in the acquisition cycle; what is required to proceed to the next phase; what can impact the achievement of A_O; and how the variance of one element or component from its threshold impacts the achievement of system material readiness.

This handbook was written for the layman. There is no expert on all aspects of a system acquisition, but there are many experts on specific aspects of acquisitions. The Program Manager who seeks that expertise, tailors their input to his/her specific system acquisition, and manages the acquisition utilizing the tools available to him/her becomes the only expert on his/her specific system.

	Pre-Milestone Ø	Ø	Pre-Milestone I	I	Pre-Milestone II	II	Pre-Milestone III	III	Post-Milestone III
	Mission Area Assessment/ Use Study	JMSNS/ or	Concept Exploration	SDP/ NDCP/ TEMP	Demonstration & Validation	DCP/ NDCP TEMP	Full Scale Development	DCP/ NDCP TEMP	Production & Deployment
Ao Component	Duty Cycle (K-Factor)		Duty Cycle (K-Factor)		Duty Cycle (K-Factor)		Duty Cycle (K-Factor)		Duty Cycle (K-Factor)
Reliability (MTBF)	Mission Terms		Range		Threshold Value		Threshold Value		Threshold Value
Maintainability (MTTR)	Similar System		Similar System		Threshold Value		Threshold Value		Threshold Value
Supportability (MLDT) • Maintenance Planning • Manpower Personnel • Support Equipment • Technical Data • Training • Computer Support • Facilities • PHS&T • Design Interface • Supply Support	System Standards		System Standards		System Specific Requirement		System Specific Requirement		System Specific Requirement
Ao	Mission Terms		Range		Threshold Value		Threshold Value		Threshold Value

Figure 6-1